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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,152	10/21/2003	Stephen L. Prucher	9539-000098	3907

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EXAMINER	
COMPTON, ERIC B	

ART UNIT	PAPER NUMBER
3726	

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/690,152	PRUCHER, STEPHEN L.	
	Examiner	Art Unit	
	Eric B. Compton	3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 29-37 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 29-37 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

. DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 29-30 and 34-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. 3,535,762 to Taylor in view of U.S. Pat. 3,100,333 to Friend.

Taylor discloses a method of manufacturing a gear comprising:

providing a die assembly having an upper die (26), a lower die (17) and a mandrel (24), one of the upper die and the lower die defining a plurality of gear teeth (56), the upper and lower dies forming a closed die that defines a die cavity, the mandrel being received into the die cavity;

providing an insert portion (23) formed of a solid substantially void-free metal (e.g., tubing), the insert portion having a hollow body and at least one groove (*see* Col. 3, lines 59-63), the hollow body having an interior surface, the groove extending about the hollow body;

positioning the insert portion onto the mandrel such that at least a portion of the mating splines matingly engage the splines formed on the mandrel;

positioning a preform portion (22) within the die cavity such that the perform portion extends circumferentially about at least a portion of the insert portion, the performing portion being formed of a solid substantially void-free metal (e.g., billet);

pressing the preform portion between the upper and lower dies in a pressing direction to form a plurality of gear teeth on the preform portion in single stroke, the perform deforming in at least one axial direction, a radially inward direction and a radially outward direction during the single stroke such that the preform portion is deformed about the groove so as to be fixedly engaged to the insert portion. *See* Cols. 2-3, lines 70-4.

Taylor further discloses, "In the event that a very high torque application is required, the shaft to which the gear is joined can be knurled, flattened or grooved prior to forging in order to provide a higher strength bond between the gear and the shaft." Col. 3, lines 59-63. However, the reference does not disclose providing the insert portion with a flange that extends circumferentially about the hollow body.

Friend discloses a method for making compound gears. A hollow body insert portion (10) is joined to a preform portion (11) by a forging process. The insert portion is provided with a flange (13), including indentation or shallow teeth (13'), that extends circumferentially about the hollow body insert portion. Like the groove means of Taylor, Friend discloses:

> The primary object of the present invention, therefore, is to provide a simple method of fabricating compound gears which not only reduces the cost of fabrication but also insures a tight and lasting fit at the point of jointure. More specifically, the invention contemplates a method of making compound gears by first fabricating the respective gear bodies or blanks separately and then joining

> them is a manner such as to, in effect, forge the hear bodies into an integral unit at the point of juncture.

Col. 1, lines 40-49. Furthermore, the forging "caus[ed] the metal at the joining area to be 'forged' into the recess and the teeth to become embedded in the metal, positively locking the gears against both endwise and annular displacement, without any possibility of the slightest clearance or play at the point of juncture." Col. 2, lines 52-56.

Regarding claim 29, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the gear of Taylor, by providing the insert portion with a flange that extends circumferentially about the hollow body, in light of the teachings of Friend, in order to "lock[]the gears against both endwise and annular displacement, without any possibility of the slightest clearance or play at the point of juncture." *Id.*

Regarding claim 30, Taylor discloses heating the preform portion prior to pressing. *See* Col. 2, lines 59-63.

Regarding claims 34-37, both Taylor and Friend disclose locking features to prevent radial movement of the insert portion relative to the preform portion. Friend further discloses providing the flange with a series of indentation or shallow teeth (13'). *See also* U.S. Pat. 3,20,665 to Wells, Figure 3 (showing teeth scalloped design). Other designs of the flange and locking features are within the purview of a skill artisan based on the application of the gear. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

3. Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor/Friend in view of U.S. Pat. 3,962,772 to Haller.

Taylor and Friend disclose invention cited above. However, they do not discloses providing a bond material between the preform and insert portions.

Haller discloses a method for forming a gear and shaft composite, in which a gear is joined to a shaft while forging a billet to form the gear. Like, Taylor and Friend, Haller discloses providing the shaft with knurls or splines to resist rotation. As shown in Figure 6, the splines extend away from a body portion of the shaft. Haller further discloses providing a brazing material between the two elements to compensate for expansion and enhance bonding. *See* Col. 1, lines 14-15.

Regarding claims 31-32, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the gear of Taylor/Friend by providing a brazing material between the preform and insert, in light of the teachings of Haller, in order elements to compensate for expansion and enhance bonding.

4. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor/Friend in view of JP 07-051789 to AISIN and/or U.S. Pat. 3,842,646 to Kuhn.

Taylor and Friend disclose the invention above, including that "the shafts may have any type of cross-sectional configuration." Taylor, Col. 1, lines 64-65. In such a case, the mandrel would be configured to engage the tube to resist deformation during forging. *See* Taylor Col. 3, lines 1-5. Also, as shown in Figure 1 of Taylor, both the insert and pin have complementary surfaces of engagement.

However, the references do not disclose the mandrel includes a splined portion matingly engages an internal splines formed on the insert portion.

AISIN discloses a method of forging a gear having an internal spline. Furthermore, Kuhn discloses a method of forming a gear having an internal spline. These reference clearly suggests that gear shaving internal splines are known presumably to engage a shaft having corresponding splines as well.

Regarding claim 33, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the gear of Taylor/Friend with a mandrel having a splined portion to engage internal splines formed on the insert portion, in light of the teachings of AISIN and/or Kuhn, in order to provide a gear having an internal splines to engage corresponding splines on a shaft.

Response to Arguments

Applicant's arguments with respect to claims 9 to 28 have been considered but are moot in view of the new ground(s) of rejection of claims 29-37.

It is noted that the Specification does not expressly describe "a solid substantially void-free metal" for use as the insert and preform portions. However, the Examiner is interpreting this limitation as a conventional metal preform, e.g. a billet or tube, other than formed form a powder metal. *See* Specification at [0029].

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Prior Art References

The prior art references listed on the enclosed PTO-892, but not used in a rejection of the claims, are cited for their teachings of forming composite bearings by forging.

AAPA, as found on pages 1-2 of the specification, discloses the prior art methods for manufacturing a differential assembly having a gear which is rotatable mounted in a case.

GB 1,265,137 is believed to be an equivalent of Taylor.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (571) 272-4527. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David p. Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eric B. Compton
Primary Examiner
Art Unit 3726

ebc